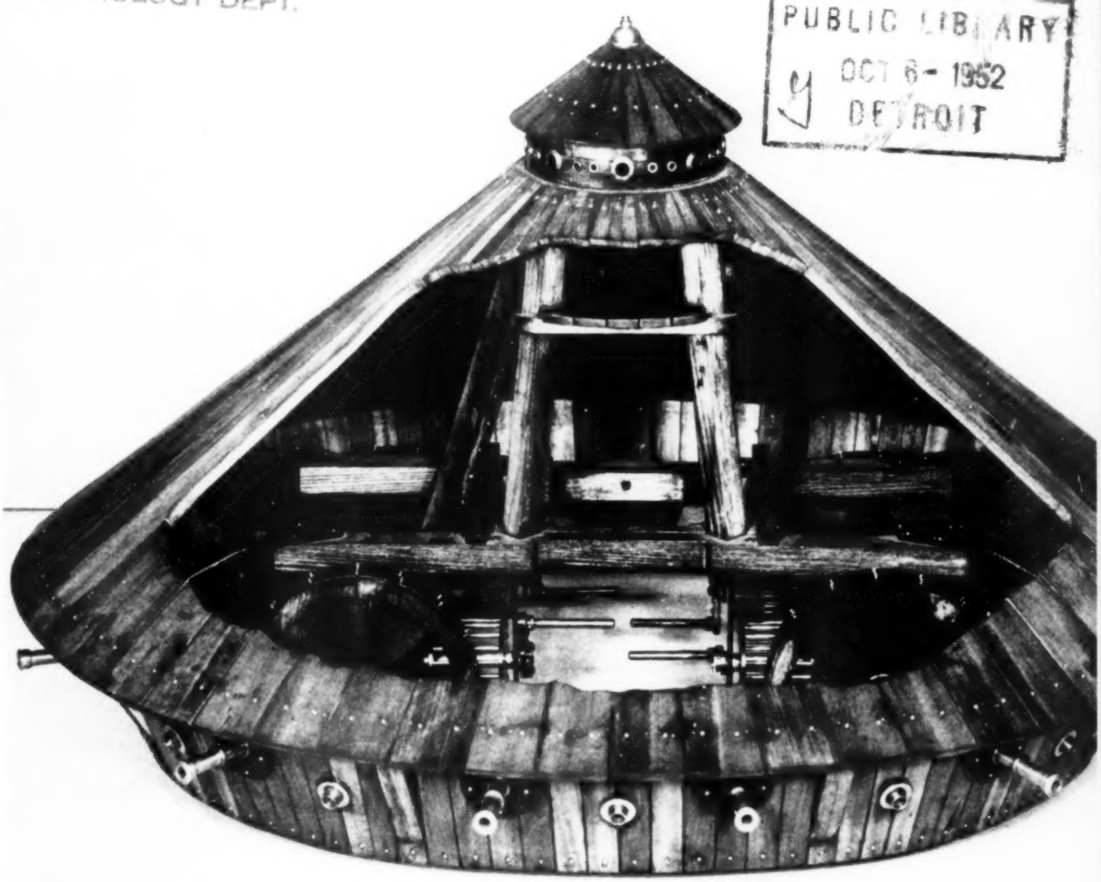
Midwest Engineer

SERVING THE ENGINEERING PROFESSION



WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

PETTICOATS
AND
SLIDE RULES—PAGE TWO

Vol. 5 AUGUST, 1952 No. 3

MIDWEST ENGINEER
Published Monthly
BY
THE WESTERN
SOCIETY OF ENGINEERS
AT
2207 DODGE AVENUE
EVANSTON, ILLINOIS

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Single copy ....$ .50
Annual subscription 4.00
Foreign subscription 6.00

Entered as second-class matter September 23, 1948 at the post office at Evanston, Illinois under the Act of March 3, 1879.

Midwest Engineer

A Publication of the

WESTERN SOCIETY OF ENGINEERS

Serving the Engineering Profession

AUGUST, 1952 Vol. 5, No. 3

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Special Notice

M. V. Burlingame, Vice-President in charge of Operations of Natural Gas Pipeline Company of America, will be the speaker at the WSE meeting scheduled for Monday, October 13. This will be the first of the semi-monthly general meetings which will take the place of the former weekly meetings. However, the time and place of the meetings remain unchanged.

"Natural Gas Transmission and Storage" is the title of Mr. Burlingame's talk. It will deal with engineering and construction problems met in building a natural gas pipeline. The film, "Welding America," will be used to illustrate the talk.

Also discussed by Mr. Burlingame will be the techniques and problems in the storage of natural gas, particularly as applied to the recent development in storage, the Herscher underground pressure dome.

Cover Story

A cutaway view of the enclosed tank invented by Leonardo da Vinci with breech-loading cannon. Its mobility was based on four independent wheels driven by manpower. Its shape was designed to withstand the impact of the cannon balls of the day.

Petticoats and Slide Rules

by Margaret Ingels, M.E.
Engineering Editor, Carrier Corporation

In selecting the title for this talk, "Petticoats and Slide Rules," I planned to pay tribute to all women engineers who predate the "blue jeans" era. I thought at the time that the petticoat age of women engineers probably began during the days of cotton garments adorned with Hamburg ruffles. To my surprise, research proved that women entered the engineering profession during the multi-petticoat era, but we do not go back to hoop skirts and bustles!

The research to learn about early women engineers was an intriguing project, and seemed unending. The stack of information which came in from the secretaries of national societies, from the Women's Bureau, U. S. Department of Labor, from engineering colleges, and from men engineers grew higher and higher with each incoming mail. Soon it became evident that the complete story of the early women engineers was much too long to tell in the time allotted to me. Therefore, instead of recognizing all of them, my remarks will be limited to those who may be called "trail blazers" or "pioneers". And, for want of adequate data from foreign countries, this discussion will be limited to American women. I also fear I have inadequate data on American women, so I hasten to make an apology. I ask forgiveness of those women pioneers in the engineering profession who are unknowingly omitted because their names and works were not discovered during the study. I also ask forgiveness of those women who are recognized in this paper because they have advanced the frontiers for women engineers and thus earned the title of "pioneer" but who, by dynamic spirit, are much too young for me to pin such a label on them.

The data assembled in the historical study of early engineers in petticoats warranted chronological presentation. However, the procedure of dating women posed a problem. (It never occurred to me to use the year of birth, for those women still active in engineering, although many such dates are available from various editions of Who's Who.) After some consideration, the date selected was the time a woman entered the profession as a graduate with an engineering degree, the year she started work as an engineer, or the year she qualified as a member of an engineering society—the earliest of the three.

With the "ground rules" explained, and again with apologies for omissions, the procession of pioneer women engineers starts. They pass our reviewing stand.

1886 Edith Julia Griswold leads the procession of engineers in petticoats. To her goes the title of "Trail Blazer." She, born in 1863 in Connecticut, studied civil and mechanical engineering at the age of twenty-one, and for two years took a course in electrical engineering at New York City Normal College. She also studied law at New York University. In 1886 Miss Griswold opened an office on Lower Broadway in New York City as a draftsman, and specialized in patent office drawings. Who's Who in Engineering (1925) generously recognized her as an engineer and as a patent law expert.

1893 The year 1893 brings Bertha Lamme before our reviewing stand. In that year she was graduated from Ohio State University and received the degree of M.E. in E.E. She accepted employment with Westinghouse Electric Company, which today lists a dozen women engaged in important engineering work and more than one hundred others in related positions. From 1893 to 1905, Miss Lamme worked on mathe-

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This talk was presented by Miss Ingels September 4, 1952, before the Western Society of Engineers. Miss Ingels is the first woman to graduate from the University of Kentucky's College of Engineering.

matics of machine design. She then married Russell Feicht, a fellow engineer in the Company, and retired from professional activity. Mrs. Bertha Lamme Feicht earned her position in the parade of women engineers as an early, if not the first, woman to receive a degree in engineering.

1894 Mrs. Lena Allen Stoiber enters the parade of petticoat engineers in 1894. In that year she qualified for associate membership in the American Society of Mining and Metallurgical Engineers as the owner of the Silverton Mine in Silverton, Nevada. An endorser of her application for membership in the Society recently recalled his acquaintance with her. He began his letter with, "Lena Allen Stoiber was a character—most intelligent—a masterful woman." He further adds that she asked him to manage her mine, but he declined as he felt that it would be "most unpleasant to be bossed by her." The endorser wrote that Mrs. Stoiber sold her mine, became socially prominent, with a fine house and ample wealth. In 1922 Mrs. Stoiber married again, and hyphenated her name to become Mrs. Lena Allen Stoiber-Ellis. She remained a member of the American Society of Mining and Metallurgical Engineers until her death in 1935.

1895 Next Marion Sara Parker passes before us. She was graduated from the University of Michigan in 1895 with a degree of B.S. (C.E.), having completed the four-year engineering course in three years. First she was employed in the Chicago office of Purdy & Henderson, structural engineers. When the firm opened an office in New York City, Miss Parker joined the staff there. The chief engineer in the New York City office recently recalled her excellent work. He wrote, "The complete calculations, foundation and framing plans for a large office building on Lower Broadway were put under her sole charge. When they were filed in the Building Department by the architect, to his complete and agreeable surprise, Miss Parker's plans came through with only three minor objections." He also wrote, "Miss Parker held her own with engineers and draftsmen in the office; her work was eminently satisfactory—neat, quick, accurate." About 1905 Miss Parker resigned, returned to her native state, and married, becoming Mrs. Marion Parker Madgwick.

1900 After Mrs. Madgwick walks Marshall Keiser. Her training and professional life earn her a unique position even among early women engineers. She was born in Alexandria, Kentucky in 1874, entered the Agriculture and Mining College of her native state university. Like another famous pioneer of Kentucky, Daniel Boone (who was a civil engineer), Miss Keiser blazed a trail. She continued her technical training at Ohio Mechanics Institute, and the Institute of Technology in Munich, Germany. After completing her formal education, she taught chemistry for five years. In 1900 she accepted a position as chemist of West Java Sugar Experimental Station on the Island of Java. In 1903 she became Mrs. Leland Wallace Holt, and retired from professional life until after her husband's death in 1908. She then became president and manager of the Holt Land & Cattle Company of Colorado and New Mexico, and president of the New Mexico Iron & Coal Mining Company of California. In 1912 she resigned from her executive positions and, from then on until her death in January, 1952, she engaged in farming, mining, and land development. She wrote many engineering articles which were published in chemical and mining journals. "Who's Who in America" records that Mrs. Marshall Keiser Holt adopted and educated six orphans,—this in addition to her many activities in the engineering profession.

1903 Minette Ethelma Frankenberger joins the procession of women engineers in 1903 with a degree of B.S. (C.E.) from the University of Colorado. She worked as a draftsman from 1906 to 1909. Little is known of her professional career. However, we honor her as an early graduate in civil engineering.

1904 In 1904, Florence Hite joins the women engineers for a short period. After receiving the degree of civil engineering in architecture from Ohio State University, she married a mining engineer and did not continue in her professional career.

1905 In 1905, Nora Stanton Blatch, the first woman to be graduated from Cornell University with an engineering degree, enters the parade of pioneers—she with a degree in civil engineering. She is still marching forward with youthful vigor. She recently wrote that she had to put up with a "lot of razzing" when on campus, but many of the friendships made at the time have continued through the years.

When big company representatives arrived at Cornell in the spring of 1905 to select graduates, they did not discriminate against Miss Blatch—they could not as her grades were in the top five of her class, and had earned her membership in Sigma Xi. American Bridge Company employed her. She made good—became a "squad boss" after three weeks of employment.

Miss Blatch later became assistant chief engineer and chief draftsman, with thirty men working under her, at the Radley Steel Co. Because the wages of an engineer did not satisfy her, she established her own contracting business.

(Continued on Page 4)

Edith Julia Griswold, right, shown in the drafting office she opened in 1886. She specialized in patent office drawings. Miss Connor appears at the left. (Date of picture, 1889 or 1890.)

(Continued from Page 3)

Alice C. Goff

Today, Mrs. Morgan Barney, formerly Miss Norma Stanton Blatch, continues her contracting work in Greenwich, Connecticut, where she specializes in large residences—costing up to $135,000 each.

1914 There is a long gap in the procession of pioneer women engineers who entered the profession between 1905 and 1914, but there is no void. During this period Miss Kate Gleason made history for women engineers. In the school year of 1884-85, and again in 1888, she studied as a special student in Mechanical Arts at Cornell University. She was the first of the "Sibley Sues", a term applied to women enrolled in the Sibley College of Engineering of that great educational institution. She continued her studies in engineering with on-the-job training under her father at the Gleason Gear Works in Rochester. By 1914 her design of a worm and gear had brought her such distinction that the American Society of Mechanical Engineers accepted her as a member—the first woman to be so honored. She represented the Society several times at world conferences.

Miss Gleason made history in another profession not generally opened to women in her day. She was the first woman bank president in the country. She designed and manufactured fireproof houses with unskilled labor that won her additional recognition to that of being the first woman mechanical engineer. When asked in 1930, three years before her death, to what she attributed her success, she said, "A bold front, a willingness to risk more than the crowd, determination, some common sense, and plenty of hard work."

If entrance in the procession of pioneers were based on the date a woman decided to be an engineer, Kate Gleason would lead all others with her entrance in Cornell in 1884. However, by the "ground rules" she joins the parade of petticoat engineers in 1914 as a member of the American Society of Mechanical Engineers. In spite of the date, I think of her as a real "trail blazer", the leading spirit for all women engineers whose formula for success should be adopted by all in the engineering profession—both men and women.

1915 In August, 1914, Germany invaded Belgium. World War I started. Then, as in World War II, there was a shortage of men engineers. Women who aspired to enter the profession then, as do the daughters and granddaughters of their contemporaries today, found new doors opened to them. Alice Goff in her *Women Can Be Engineers* aptly describes the situation. She wrote, "By an irony of fate, war, always bitterly denounced by women, has advanced them in the engineering profession."

Among the first women to benefit from a shortage of engineers due to World War I were Alice C. Goff (she knew whereof she wrote) and Hazel Irene Quick. Both were graduated from the University of Michigan in 1915 with bachelor's degrees in civil engineering.

Alice C. Goff, after graduation, did appraisal work for the Dean of the College of Engineering for six months. She then joined Truscon Steel Company in Youngstown, Ohio, and has remained with the company ever since. For many years she was squad leader of a group of men. Today she designs and estimates reinforced concrete for large buildings in the United States and South America—one of her largest was a $15,000,000 bomber plant in Texas during World War II. She holds a professional engineer's license in Ohio.

Hazel Quick, after graduation in civil engineering in 1915, spent eighteen months in appraisal work and surveying. In 1917 she joined the Michigan Bell Telephone Company, where she became Assistant Plant Extension Engineer. Her work, until her retirement in 1950, concerned special services and introduction of newly developed telephone equipment. She is a charter member of the Detroit Chapter of the Michigan Society of Professional Engineers and is serving a second term (which expires March 1, 1955) as a mayor-appointed Commissioner on the City Plan Commission of Detroit. At her summer home, Miss Quick uses a tractor for gardening and operates her own electric power equipment for carpentry work.

Lydia G. Weld accompanies Miss Goff and Miss Quick, the 1915 entries. After attending Bryn Mawr, Miss Weld studied naval architecture at the Massachusetts Institute of Technology. She was graduated in 1903, and accepted a position with the Newport News Shipbuilding and Dry Dock Company in Newport News, Virginia. There she had charge of making finished plans for government ships. In 1915 she became an associate member of the American Society of Mechanical Engineers; in 1935 a full member. She retired in 1917 because of ill health, and moved to California. There she today runs a 400-acre alfalfa, hog and pear ranch. She maintains her interest in engineering and continues her membership in the American Society of Mechanical Engineers.

1916 In 1916, I join the procession of engineers in petticoats, with a degree in mechanical engineering from the University of Kentucky.

1917 Dorothy Tilden Hanchett, University of Michigan, B.S. (C.E.), 1917 next comes into view. She worked in the office of the City Engi-

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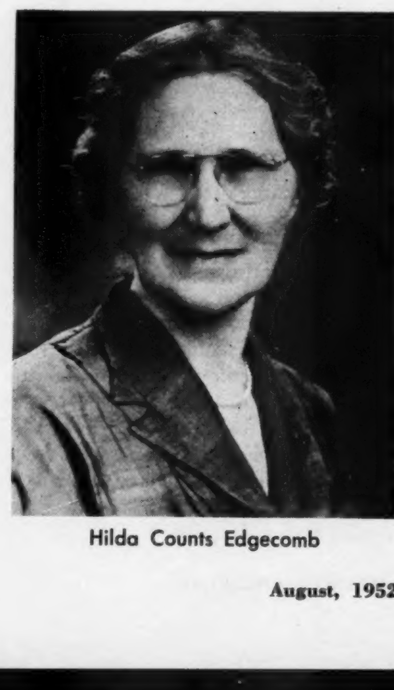

Hilda Counts Edgecomb

Bridges

By Donald N. Becker
A. J. Boynton and Company

A bridge is defined in Webster's Unabridged Dictionary as "a structure erected over a depression or an obstacle, as over a river, chasm, roadway, railroad, etc., carrying a roadway for passengers, vehicles, etc." Of course, there are other meanings of the word but the above is the one we are concerned with. Let us study the definition:

First—It is "a structure."

Second—It is "erected over a depression or an obstacle" and goes on to enumerate several examples which we could expand considerably, even to gaps between buildings.

Third—It is "carrying a roadway for passengers, vehicles, etc." This infers that it is erected for moving traffiic, although on occasion it may support stationary objects.

From this analysis it is readily evident that there are literally thousands of bridges in the City of Chicago. Among these are the bridges across the river systems carrying streets and railroads over them; those carrying streets over railroads and the reverse; those carrying one street over another or a second level of a street; those spanning between two adjacent buildings; those carrying manufacturing operations or their products from one place to another and even the elevated railroad is a succession of bridges spanning from column to column almost without end.

To discuss all these various bridges would consume more time than is allotted to this paper; hence, the discussion will be limited to those over the City's river systems.

Chicago has two such systems; the Chicago River and the Calumet River. Both of these rivers have had their flow reversed so as to draw water out of Lake Michigan.

The Chicago River starts at Lake Michigan and runs about 1.3 miles from the lake in a generally westerly direction along the northerly side of the central business district. At this point it is joined by a branch originating some 20 miles northwest of the city, and meandering through the north and northwest sections of the city to a junction with the main river near Lake and Canal Streets. It is joined near Lawrence Avenue by an artificial canal which brings water from the lake at Evanston into the upper reaches of this river.

From the junction near Lake Street, the river leads southward about two miles past the central business district, thence southwesterly some two more miles. At this point, it empties into the Chicago Drainage Canal which leads southwesterly out of the city and on to the Desplaines River near Joliet.

Parts of this river system are navigable for masted vessels and for barges still further. For masted vessels navigation extends from the lake through the main river and up the North Branch to Belmont Avenue and through the South Branch to the Sanitary Canal at Western Avenue. There is also a fork southward from this branch at Ashland Avenue which is navigable for about 1 mile.

The Calumet River starts from Lake Michigan about 12 miles south of the Chicago River and leads generally southwesterly. Some six miles from the lake there is a fork, one branch leading into Lake Calumet, a shallow body of water some two miles long and about ¾ mile wide. The other fork leads southerly about one mile, then westerly to about Ashland Avenue, where it empties into the Calumet Sag Canal leading into the main Drainage Canal. This river system is navigable for masted lake vessels from the lake into the lower end of Lake Calumet and for barge traffic through to the Drainage Canal.

The necessity of providing for this navigable condition has required the use of movable bridges over both river systems so that they may be opened for the masted vessels on occasion.

This has resulted in the construction of nearly 60 movable bridges for highway use and about a score for railroads.

With this great number of bridges it is reasonable to expect many different types. There are truly many different types and even among the individual types there are many variations due to local conditions and development of the art through the years, as some of them are almost 60 years old.

In addition to the movable bridges, the upper reaches of the rivers are spanned with numerous fixed bridges of various types.

This paper will limit itself still further by discussing only the movable bridges.

In the early days of Chicago, starting as long ago as 1833, the first bridge, a movable one, was constructed, followed through the years by a succession of various types which standardized about the time of the Chicago fire in 1871 in the so-called "swing bridge" which consisted of a steel structure which was supported on a circular pier in or near the middle of the river, and which could be rotated in a horizontal direction so that it became parallel with the river to permit boats to pass on one or either side of the center pier.

As the demands of street traffic in-

(Continued on Page 8)

This talk was given by Mr. Becker before the Western Society of Engineers on September 4, 1952. Mr. Becker, Past President of the Society, is Chief Structural Engineer of A. J. Boynton and Co., Chicago, Illinois.

Our Untapped Source of Engineering Talent

By Beatrice A. Hicks
Newark Controls Company

All of you know the great attention now focused on means of expanding and increasing the efficiency of American Engineering. The search for large potential sources of additional personnel in any field of work dictates an examination of two facets of the problem (1) the composition of our total working population and (2) secular trends of this composition.

The rapid growth of the part played by women in American industry parallels that of the growth of industry itself. Many of us in our lifetime have observed a large part of the change that increased them from 16½% of our total working population in 1890 to the current 20,000,000 or 31% of the working people in the U. S.

Examination of figure I, where this growth is indicated, stimulates the imagination to project the curve during the next decade and the next half century. Even should one reject the risks of projection, the existing curve cannot fail to establish very large changes during the last decade.

The American working population is composed of larger and larger percentages of women, who are expanding the forces of many different occupations.

This country's productive power depends on the quantity and utilization of this working force. Owing to the many scientific developments of the past century an increasing proportion of our total manpower has been employed as engineers. The curve showing this increase is so familiar to you that it will not be repeated here.

Thus, there are two independent circumstances affecting the quantity of engineers needed. First—the women swelling our labor forces must be matched by the requisite number of engineers to maintain the balance demanded by industry. Second—Technological advances may continue to change the ratio of engineer to worker.

Since engineering requires both the ability and willingness to successfully complete college, figure II, showing our college graduates, is pertinent. This curve indicates in a more moderate manner some of the same trends that the Working Population Curve shows. Women, with the exception of the period affected by veterans training, are forming increasingly larger shares of our college graduates. Their current annual rate in the U. S. exceeds 105,000. This is 105,000 women willing and able to graduate from college each year. In 1951, 77 of them graduated in engineering.

Almost this entire 105,000 have never been screened for engineering abilities; have never been advised that engineering is a profession open to them; and in some instances their scientific curiosity has been discouraged.

It is recognized that engineering aptitudes do not exist in every college graduate, but that they do exist in a significant portion of these graduates. Even the most modest estimates point out the inadvertent waste of graduating less than 100 women engineers per year in all of the U. S.

This problem deserves a view from another direction—less statistical—less well defined—but perhaps more important potentially in this question of technical manpower. Trained engineers, who differ in their degree of productivity, range from those responsible for proficient engineering projects to marginal talent. Industry has experienced expense and disappointment when such marginal talent has caused losses that have exceeded the value of its contributions. And, what is more, it is demoralizing to the engineer, who after many years of training and experience, eventually recognizes that his abilities have

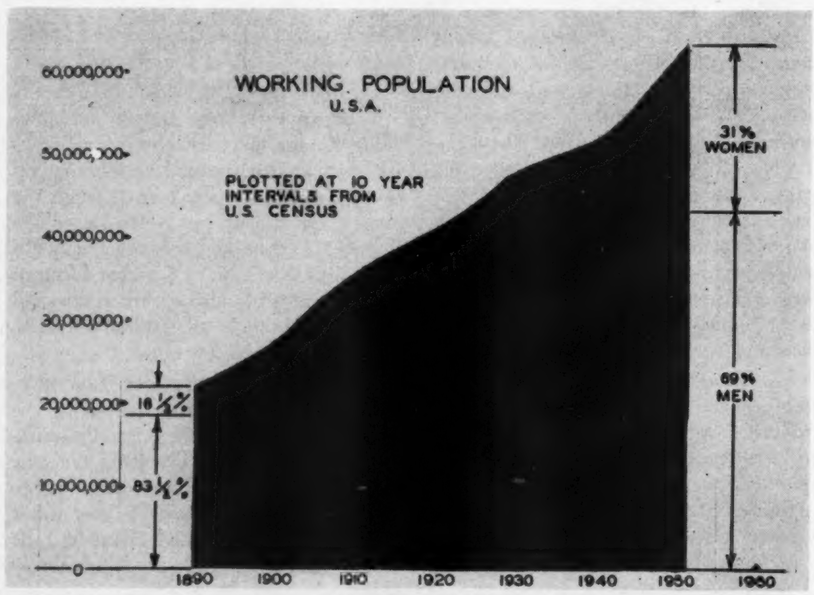

FIGURE 1

Miss Hicks gave this talk before the Western Society of Engineers on September 4, 1952. Miss Hicks is Past President, Society of Women Engineers; Vice-President and Chief Engineer of Newark Controls Company, Bloomfield, New Jersey.

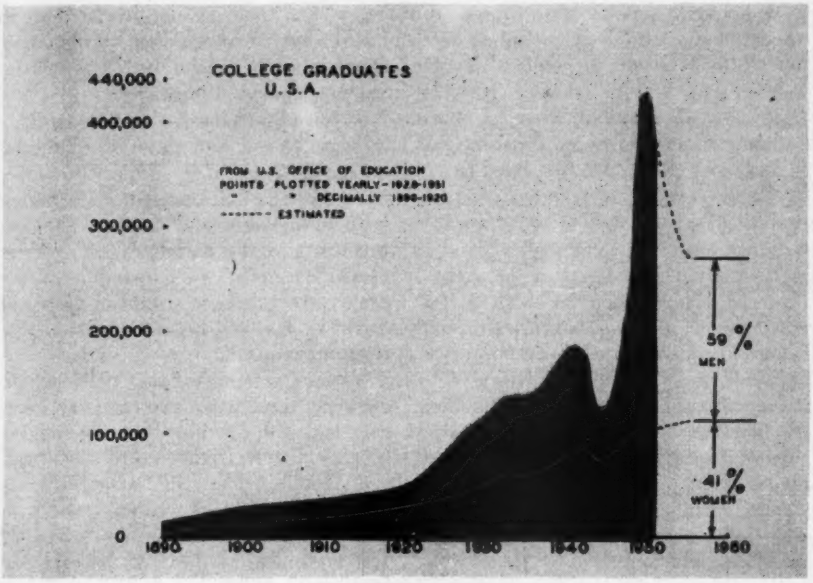

FIGURE 2

been misapplied, and that he cannot cope with variables intrinsic to engineering. The employment of individuals without the appropriate talents, merely to fill the engineering ranks, will not provide the relief we are seeking.

Graduate women engineers today represent a recognizably high level of ability scholastically and professionally. The best potential engineering talent among them has hardly been sampled. Large numbers of engineers may be drawn from the top of this group before the problem of marginal talent becomes serious.

What scientific achievements have we lost through lack of development of this resource? Could these achievements have meant an increase of the efficiency of our scientific developments by fifty percent, or twenty five, or even ten?

Economic factors have been effective in producing a dynamic mid-century picture of the status of women in engineering. Concentrations of engineers are graphically illustrated in figure III. During college training a student selects a broad branch of engineering such as aeronautics and following graduation usually selects a phase of engineering work such as aeronautical design. The point representing this person is in the square opposite "Aeronautical" and under "Design". "service" has been used to indicate those fields which serve engineering such as teaching and writing.

Any plot of this type presents a broad picture as there are always undefined areas and current movements it cannot reflect. However, figure III is an effective bird's-eye-view of the distribution of women in engineering work. The greatest numbers are employed in the research, design, and development phases of the electrical, mechanical, civil and chemical engineering fields. In the opposite corner of the graph, sales in the mining field, there is a void so far as I have been able to determine. The wave front of the movement of women into engineering is proceeding from the upper left corner toward the lower right.

This subject is receiving a great deal of attention now—most of it objective—some of it rationalization of unconfirmed theories. However, the over all effect is undeniably one of rapid progress both in the educational channels and in the incentives offered through professional opportunities.

Once powerful negative influences, frequently arising from the lay public's confusion of engineering with heavy manual tasks, are rapidly disappearing. There remain but a few groups so disinterested in the effect of their student guidance that they are offering advice composed ten years ago from the limited experiences of one individual. However, the latter can be particularly dangerous when the organization is financially able to provide wide distribution for their printed material.

Positive influences are many and varied. America is indebted to the Educational, Industrial and Professional groups such as the Western Society of Engineers for their constructive interest.

The Society of Women Engineers has recently established a Professional Guidance and Education Committee to provide general information on engineering education and employment to young women.

This source of engineering talent will not long remain dormant.

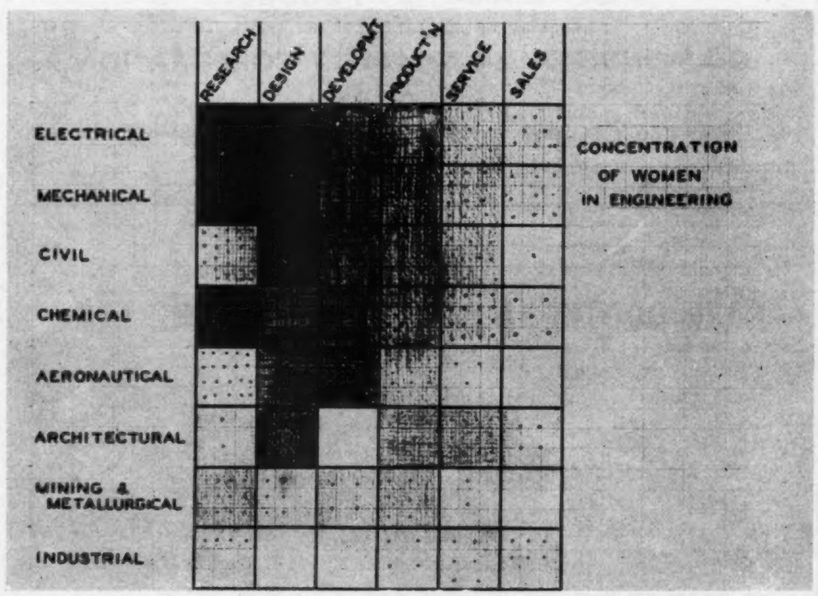

FIGURE 3

(Continued from Page 5)

creased, these bridges had to be made wider, the early ones being only two lanes wide—the later four. This wider construction also required the use of larger center piers which, thus, became a greater obstruction in the river.

Finally, it became necessary to develop bridges which would not obstruct the river. This was also hastened by the construction of the Sanitary Canal in the decade of 1890-1900, which reversed the river flow and required the withdrawal of a larger quantity of water from the lake than the river channel at the swing bridges could accommodate without excessive current.

Between 1890 and 1900 various types spanning a suitable navibale channel and opening vertically were built.

About 1899 the city's engineers felt that none of the types built were "the last word" so they made a study to determine the best type. They concluded that the trunnion bascule was such. Three designs were prepared by the city, differing in appearance, method of mounting, etc. but all involving the principle of revolving on a fixed trunnion. The three designs were then submitted to a Board of Consulting Engineers consisting of E. L. Cooley, Ralph Modjeski and Byron B. Carter. The board recommended the design designated as No. 3 with some modifications.

The design was described as a fixed center, double-leaf, counter-balanced bascule bridge. Each leaf had three through trusses operated by racks on their curved tail ends, the tail ends descending into pockets or tail pits in the abutments when the bridge was open. The break in the roadway was on the river side of the pivot.

The machinery for operating the leaf was under the approach roadway and each leaf was operated by means of a pinion gearing with a rack on the curved tail end of each truss. The bridge structure was balanced about the trunnion by adding weights on the tail end below the roadway so that it was in balance and thus required an operating force only sufficient to overcome inertia, friction, and wind pressures.

The trunnion bascule was adopted as the type to use, and about 40 of the 60 odd bridges are of this type. Of course, in the period of 50 years since 1900 there have been many modifications and refinements in the design of the bridges as evidenced by a comparison of the State Street bridge with the Cortland Street bridge, which was the first of this type constructed.

Various versions of this type include the early three truss, two roadway, high gear end with overhead bracing such as Cortland Street, Division Street, N. Western Avenue bridge; the later two truss single 36 to 40 foot roadway type with trusses extending only some 10 to 12 feet above the roadway at the rear end without bracing, such as Clark Street, Franklin-Orleans and Monroe Street bridges; deck bridges with everything below the roadway, such as Adams Street, and Jackson Boulevard bridges; double deck bridges with roadway on lower and elevated railroad on upper deck, such as Lake Street and Wells Street bridges; a double deck bridge with roadway on both levels, such as Michigan Avenue bridge; railing height bridges in which the top chord of the bridge is at railing height such as Madison Street, Wabash Avenue and State Street bridges; single leaf bridges where it was impractical to use a second rotating leaf on one side of the river such as Kinzie Street and 35th Street bridges; bridges with wide roadways such as La Salle Street with a single six-lane roadway; Wabash Avenue with two three-lane roadways and State Street with two four-lane roadways, and the new Congress Street bridge which will have two four-lane roadways but will be split longitudinally with one bridge set 31½ feet in advance of the other to provide for the skew of the channel.

The remaining 20 odd movable bridges are divided among several types. There are a few of the old swing bridges such as Fullerton and Diversey Avenue bridges. There are several rolling lift bridges of a type patented by William Scherzer. They are dissimilar from the trunnion bascule in that the rear end of the bridge emulates a wheel rolling on a track in opening to a nearly vertical

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Centennial's Third Phase Begins September 3

The convocation of engineers, third phase in the 1952 Centennial of Engineering, began September 3 for ten days and brought to Chicago, representatives of 64 national and international engineering societies and 22 foreign nations, estimated to total 30,000 persons.

Celebrating the 100th anniversary of the establishment of the first American engineering society in 1852, the Centennial began early in July, under the guidance of Lenox Lohr, when the curtain went up on the musical extravaganza "Adam to Atom" in the main theatre of the Museum of Science and Industry.

This was followed in August with the opening of the costly exhibit depicting the underlying reasons for America's high standard of living. It occupies some 10,400 square feet in the balcony of the East Court of the spacious Museum on Chicago's Lake Front.

Hailed by Herbert Hoover, Charles F. Kettering, General Motors research authority, and leaders in both science and education fields, the Centennial has attracted the nation's eye.

The Mutual Security Agency in Washington actively utilized the importance of the engineering convocation by bringing 200 leading European engineers to the United States to study American production methods. An equally sized group came from Latin America.

Leading foreign nations represented in Chicago during the Convocation of Engineers included Canada, Algeria, Australia, Belgium, Nationalist China, France, Japan, Netherlands, Portugal, Sweden, Switzerland, England, Germany, Denmark, Italy, Luxembourg, Thailand, Indonesia, Greece, Turkey,

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position. The first of the Scherzer type built anywhere is the present Van Buren Street bridge followed shortly by the Elevated Railway bridge just north of Van Buren Street. Other Scherzer bridges are at Randolph Street, Dearborn Street and 22nd Street, each varied to suit local conditions. The bridge at Polk Street is of a type patented by Mr. J. B. Strauss and is similar to the city type except that the counterweight on the rear arm is pivoted so as to remain in a vertical position as the bridge opens, whereas in the city type the counterweight is rigid in the rear arm so it rotates with the bridge. There is one vertical lift bridge located in South Chicago over the Calumet River at Torrence Avenue. This type was used on account of a skew of nearly 45° of the channel passing through the bridge which coupled with a requirement for a 200 foot clear channel would have required an exceptionally long span bascule bridge which would have cost more than double that of the vertical lift bridge.

There are several vertical lift bridges carrying railroads over the river in Chicago, one for the Pennsylvania Railroad near Canal Street and 20th Street and two at South Chicago over the Calumet River near 95th Street for the Pennsylvania Railroad and for the New York Central R. R.

The railroads also have several swing bridges and the B. & O. Railway has a single leaf Strauss bascule in South Chicago. The railroads prefer bridges without a center break such as most of the city bridges have in order to avoid the possibility of trouble at the center where pounding might occur if the locks do not function properly.

As traffic passes over a double-leaf bridge, each leaf will deflect in proportion to the loading on each leaf. Thus, if

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neer, Flint, Michigan for three years, then entered the teaching profession—still later she married.

Next, M. Elsa Gardner passes before us. In 1917 she became gauge examiner of the British Ministry of Munitions of War in the U.S.A. She had, by that time, earned a B.A. degree from St. Lawrence University (1916), and had begun study in machine design at Pratt Institute. She continued her formal training in engineering while employed as inspector of airplanes, airplane engines, and precision gauges used in aircraft. Her schooling included classes in engineering at New York University and the Massachusetts Institute of Technology. Elsa Gardner has written many articles on aerodynamics and has earned a high place in both active service in machine design and technical writing. She continues to bring credit to herself and to women engineers with her work in the Materials Division, United States Army Air Corps at Wright Field, Dayton, Ohio.

1918 In 1918, Dorothy Hall, University of Michigan, B.S. in Chemical Engineering, a Ph.D. in 1920, comes into view. For a short time she served as research chemist, then as Chief Chemist at the General Electric Company Laboratory in Schenectady. She then was married to Mr. Gerald R. Brophy and retired from the engineering profession.

Olive Dennis

Helen Innes comes into view in 1918, as in that year she proved her high status as a heating engineer when the American Society of Heating and Ventilating Engineers accepted her as an associate member—a full member in 1923. She combined study at the New York School of Heating and Ventilating and Pratt Institute with on-the-job training, and earned recognition with her wide and successful experience in the heating field. In the mid-twenties she became Mrs. J. A. Donnelly, retired from engineering to live at Largent Springs Manor, Largent, West Virginia until her death in 1935.

Marching with Helen Innes Donnelly is Doska Monical, a geologist from the University of California—1918. After graduation, Miss Monical accepted a position with Shell Company of California. Her academic standing and professional work won her membership in Phi Beta Kappa and Sigma Xi, and an associate membership in the American Institute of Mining and Metallurgical Engineers.

1919 Frances Martin Bayard, a "Sibley Sue" of Cornell University, Class of 1919, next joins the early women engineers. A severe attack of influenza in November of her junior year prevented her from completing her course, but it did not weaken her determination to be an engineer. She applied her two years' training, first as a draftsman with Sun Ship Building Company, then as a design engineer in her father's firm, M. L. Bayard & Company, Inc., of Philadelphia. In 1921 she married Dr. Harold A. Kazmann. Today she is a director in the company her father founded, which manufactures deck machinery for battleships, aircraft carriers, and destroyers. Recently Mrs. Frances Bayard Kazmann wrote "Mine may not be a success story (from an engineer's standpoint), but it has never been dull. Being a doctor's wife is a full-time job which included organizing and planning offices as practice expanded, and assisting in my family's business to help bring it back after the depression years to win Navy 'E's' during the War."

The year the next woman enters the procession of women engineers is difficult to determine. However, there is no doubt that it was early in the century. She, Edith Clark, graduated from Vassar College in 1908, where she majored in mathematics and won a Phi Beta Kappa Key. She taught for two years, and then decided upon an engineering career. In the fall of 1911 she entered the University of Wisconsin as a sophomore in civil engineering. However, at the end of the year she accepted a position with the American Telephone & Telegraph Company and remained in the company until 1918 as a computor. During this period, she took night courses at Columbia University, and one in radio at Hunter College. In the fall of 1918 she entered Massachusetts Institute of Technology and, in 1919, received the degree of Master of Science in Electrical En-

gineering—the first woman to receive an electrical engineering degree from that institution. Again she taught—this time physics at Istanbul Women's College. In 1922 she joined General Electric Company in Schenectady. During her many years there, she accomplished much, wrote many articles on engineering subjects. So great have been her achievements that Tau Beta Pi Association awarded her the Woman's Badge—the only one given a woman for accomplishments in the field. Today Professor Edith Clark teaches electrical engineering at the University of Texas, and continues to bring credit to women in the engineering profession.

The year 1919 brings Mrs. Arthur T. Edgecomb into the parade of pioneers. Mrs. Edgecomb, the former Hilda Counts, received her A.B. degree from the University of Colorado, taught high school mathematics and physics for two years, returned to the University, studied electrical engineering, and was awarded a B.S. in E.E. in 1919—the first electrical engineering degree granted a woman by the University of Colorado.

Mrs. Edgecomb recently gave a sidelight on the attitude towards women on campus in her college days. One girl was not accepted as an engineering student because she smoked and swore in a shocking manner. A show of hands of non-smokers among women engineers may be of interest at this point! Times have changed!

In 1919 Miss Counts joined Westinghouse Electric Corporation as one of thirty-two engineers out of over three hundred applicants for a student training course. After two years with the Company, she returned to Colorado for an E.E. degree. However, instead of getting a higher degree, she became Mrs. Arthur T. Edgecomb and retired from her engineering career until after her husband's death just prior to World War II. After fourteen years' retirement, Mrs. Hilda Counts Edgecomb re-entered the engineering profession. Today she is an electrical engineer on the staff of the Rural Electrification Administration in Washington, D.C.

The year 1919 also brings into view Mrs. Olive E. Frank. With night study and on-the-job training, Mrs. Frank combined engineering and executive talents to design heating equipment and to organize her own company, which prospered throughout her lifetime. In 1919 she joined the American Society of Heating and Ventilating Engineers; in 1927, the American Society of Mechanical Engineers. At the time of her death in 1946, she was President and Treasurer of Frank Heaters Company, Inc., of Buffalo and New York City.

1920 The year 1920 brings eight women into view and each has earned the right to hold her head high.

One is Ethel H. Bailey. She began work in the Eengineering profession after attending the Michigan State Automobile School in Detroit in 1918, and taking a special course at George Washington University in 1920. In "Who's Who in Engineering" (1925), the record of Miss Bailey's activities, which started as an inspector of airplanes and airplane engines with Cadillac Automobile Company in Detroit, depicts the early history of aviation. She worked on the Liberty-12 engines, the "Shenandoah", Type 12 bombers, and the T-3 transport plane. She was the first woman admitted to full membership in the Society of Automotive Engineers—this in 1920, and the American Society of Steel Treating. She has written many technical articles. Still young to be called a "pioneer," Ethel Bailey carries on her active career in engineering today at Massachusetts Institute of Technology as an administrator in the Department of Biology. The Department has four electron microscopes, X-ray diffraction apparatus, and other types of equipment, as well as an expertly staffed machine shop to keep the equipment in condition for biological research.

Olive Dennis, another of the 1920 entries, first earned a bachelor's degree in science and mathematics at Goucher College, then a master's at Columbia University. In 1920 she was graduated from Cornell University with a degree in civil engineering. She then joined the Baltimore & Ohio Railroad Company in Baltimore, Maryland, first as a draftsman in the Bridge Engineering Department, and then as a Research Engineer. From 1920 until her retirement in 1951, Miss Dennis earned many honors. She was the first woman member of the American Railway Engineering Association, and for many years served on its committee on the Economics of Railway Location and Operation. During World War II she was engineering consultant of the Division of Railroad Transportation of the Office of Defense Transportation. She holds a patent for a window ventilator for railroad cars and, to prove her versatility, a patent on Baltimore & Ohio's famous "Blue China" dinnerware.

When you ride the B & O, observe the excellent passenger service and equipment, the efficiency of operation, the charm of the cars' interior and furn-

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ishings—all a credit to Olive W. Dennis, a woman "railroading" engineer.

Elsie Eaves, who was graduated from the University of Colorado in 1920 with a degree of B.S. in C.E., rates a "first" as she walks in the procession of women engineers—the first woman elected to full membership of the American Society of Civil Engineers. After spending two years with the Colorado State Highway Department, she joined the staff of Engineering News-Record (of the McGraw-Hill Publishing Company) in New York. Her attainments proved the value of possessing a talent rare in engineers—the ability to write. She is the exception to the rule which a past Dean of Engineering at Kentucky University told his students, "an engineer has more to tell than anyone, and tells it the poorest". Miss Eaves is a notable exception to that rule. Her contributions to engineering literature include a chapter in *"Pulesbeat of Industry"* and many articles in technical magazines. Her *"Wanted: Women Engineers"* has, no doubt, led many women into the field of engineering.

Also in the 1920 entries of women pioneers is the late Marie E. Luhring. Her career resulted from the shortage of men engineers at the end of World War I. Graduated from Hunter College with an artist's degree, she drew animated cartoons for awhile; then, in 1918, with twenty-five other women, she joined International Motors Company to be trained as an engineer—and to remain with the Company until her death in 1939.

Miss Luhring's aptitude for mechanical engineering prompted her to obtain further technical training at Cooper Union, from which she was graduated in 1922 with high honors.

To Miss Luhring goes the distinction of being elected an associate member of the American Society of Automotive Engineers in 1920. To her also goes the credit, as a key worker on the project, the development of a gas-electric locomotive in the late 1920's. Her associates recall her as "a marvelous person, a marvelous worker".

Lou Alta Melton, a classmate of Elsie Eaves, walks in the 1920 group of early women engineers with a B.S. in C.E. degree from the University of Colorado. After employment as a draftsman and promotion to junior bridge engineer with the U. S. Bureau of Public Works, she married A. S. Merrill. Today Mrs. Lou Alta Melton Merrill lives in Missoula, Montana and often uses her technical training to help out Montana State University by teaching in the Mathematics Department.

Dr. Mary Engle Pennington earns her place with the 1920 women engineers. In that year, she was elected a member of the American Society of Refrigerating Engineers to become one of its active and most outstanding members. Her entrance in engineering came after a long and successful career in physical chemistry and food research. Dr. Pennington earned her doctor's degree from the University of Pennsylvania in 1895, when she was twenty-three years old. Her work in foods led her into the mechanical refrigeration field. Here she contributed materially to improvements in the design of cold storage plants, precoolers, and commercial and household refrigerators. During the second World War, Dr. Pennington served the government with her wide experience on food preservation. She is a member of several technical societies—has received many awards. She represents the refrigerating field as she walks in the parade of petticoat engineers.

Nellie Scott Rogers enters the procession of women engineers in 1920 as an early member of the Society of Automotive Engineers. The late Miss Rogers earned her position with self-training, and deserves the recognition we give her. From 1922 to 1928 she served as President of the Bantam Ball Bearing Company, Bantam, Connecticut. She later served as active Vice-President and Treasurer until her retirement in 1929. She died in April, 1942.

Helen Smith walks with the other 1920 engineers with a degree of B.S. in E.E. from the University of Michigan. She combined the art of engineering with the profession usually associated with petticoats—home economics. She first worked for the Ediphone Company, then for many years for the Rochester Gas Company, then in the Home Economics College of Syracuse University. In each position she specialized in electrical ap-

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Third Forum for Young Engineers Starts October 7

A third **Forum for Young Engineers** will be held by WSE starting October 7 and running six consecutive Tuesday or Wednesday evenings.

The theme of this Forum will also be "Engineering in Chicago Industry" and the objective will again be that of providing to young engineers an opportunity for expanding their knowledge of engineering in the major lines of business in the community.

The speakers will be leaders in their respective industries. Their talks will be short. Emphasis will be placed on the young engineer meeting and becoming acquainted with the speakers and other leaders in the profession during the social hour in the WSE lounge prior to dinner and in devoting the major part of the meeting itself to the discussion period following the talks.

The first and second Forums have gone down in history as some of the most outstanding and progressive contributions of WSE to the engineering profession and to industry. So great was their success that many requests for a third Forum were received and as a result the new series of meetings were planned.

The program will include dinner meetings covering the following:

October 7—Electronics
October 14—Utilities
October 22—Light Manufacturing
October 28—Electrical Manufacturing Industry
November 11—Railroad
November 19—Chemical Industry

The registration fee for the Forum series of six meetings is $25.00 which includes dinner. Reservations will be received by the Secretary's office. Enrollment is limited to 100.

Obituaries

The Western Society of Engineers has just received notification of the following deaths.

Gilbert Sorber, staff engineer with Automatic Electric Sales Corp., Chicago, died February 25, at the age of 63 years.

Mr. Sorber joined the Society in 1938, and was active in its affairs, serving on many important committees. He was chairman of the Electrical section during 1946-47.

Edward G. Welling, with the engineering department of Plibrico Jointless Firebrick Co., in Chicago, died on March 1 at the age of 33 years. Mr. Welling joined the Society in August, 1951.

Seymour W. Cheney, Battle Creek, Mich., died July 22, at the age of 72 years. Mr. Cheney, a consulting engineer, joined the Society in 1928. He left Chicago about eight years ago.

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the loadings are not equal at all times there would be a differential deflection of one leaf with respect to the other unless means were used to preclude this. For this purpose, a mechanical device is built into the structure. It consists of a bolt on one leaf which is driven into a socket in the other leaf to make each leaf deflect alike. These devices must be such that the bolt may be withdrawn when the bridge is to be opened. All such devices are subject to wear and must be serviced from time to time.

Bridges are usually operated by electric motors which are coupled to gear trains that have pinions meshing with racks attached to the movable bridge trusses.

The bridge trusses usually have extensions behind the channel piers that extend under the fixed parts of the approaches which extensions carry the counterweights previously mentioned. In the process of rotating the bridge leaf to a vertical position, this rearward extension dips into a large pit. These pits are large concrete boxes which are usually supported on caissons to a firm foundation, either solid rock or hard pan located as much as 100 feet below river level. Some of the earlier bridges had these boxes supported on piles driven to a firm stratum.

The Board of Consulting Engineers of 1900 made certain comments on the proposed trunnion bascule bridge, one of the most magnificent of which was as follows:—

"The principle of the trunnion bearing meets our approval as a very simple solution of the problem, the chief advantage being the constant point and direction of application of the load on the foundation, whether the bridge is in motion or stationary, and the reduction of the number of movable parts to the minimum. The first advantage is of no great consequence if the piers are placed on an unyielding foundation, but with such foundations as can be obtained in Chicago at the majority of bridge sites, it is of great importance. The trunnion type of bridge used in these designs is an old and tried device and is not covered by patents."

Some of the other bridges that have been used do not answer these criteria in all respects. The Scherzer bridge, rolling back as it does on a track, moves its center of gravity laterally which will vary the reactions at each end of the track. Also, the experience of years has shown that this type of bridge has a tendency to creep both lengthwise and laterally. This is due to the fact that there is no restraining structure of sufficient efficacy to prevent it. True, the lower track plate has large teeth on it which mesh with holes in the track plate attached to the rear end of the bridge but these have tolerances that permit wear. Also, in the earlier bridges both the upper and lower track plates were not sufficiently thick, with the result that there was an actual rolling out of the plate.

In the case of the Strauss bridges, the addition of a trunnion suspension for the counterweight box supplied a point where it provided less rigidity in the rear end as compared with the city type with its fully attached counterweight box. To prove the relative rigidities, a test was made some years ago at the Polk Street bridge, a Strauss type, to see if one leaf could be rotated more than the other. A 2 x 4 timber was laid under one truss bearing and the bridge brought down rather hard onto it. The result was that the other truss came down onto its seat with a distortion of about 2 inches between the two trusses, proving that the river arm bracing was not sufficient to stop the distortion. The same was tried on the Webster Avenue bridge, a city type with the result that the other leaf did not come down onto the bridge seat, even when the 2 x 4 was replaced with a piece of ½ inch plate.

The changes through the years in the city type have been to improve its appearance as well as its mechanical and structural features. As a result, the Wabash Avenue bridge, completed in 1930, was awarded first prize by the American Institute of Steel Construction as the best looking bridge completed in that year in the class costing more than $1,000,000. Currently, the A.I.S.C. competition is divided into more classes so that movable bridges are in a separate class from fixed bridges, but in 1930 there was no such division. A picture of this bridge was the front cover of the January 1950 Midwest Engineer which issue also carried a more complete story of the earlier bridges.

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pliances for the home. Helen Smith is now retired, and lives in Key West, Florida.

1921 Alice Gertrude Bryant, M.D., is one of several women who join the parade in 1921. She comes as a member of the American Society of Heating and Ventilating Engineers. With several other doctors at that time, Dr. Bryant was attracted to the profession by studies on air, conducted at the research laboratories of the society. Doctors joined with air conditioning engineers to determine the combination of temperature, humidity, and air motion which most people liked best. Dr. Bryant brought to the research, experience from a long and successful career in medicine. She studied at Massachusetts Institute of Technology and Women's Medical College, earning her M.D. degree in 1890. A pioneer in two professions which numbered few women at the turn of the century—medicine and engineering, she served both faithfully until her death in 1942, at the age of eighty.

Mary Reith

Mildred Pfister, another 1921 entry, carries the title of "Power Plant Equipment Engineer" for a Cincinnati company. She qualified for the unique position with a bachelor of science degree—chemistry major—from the University of Cincinnati, from which she was graduated in 1919. Her work from then on proved she possessed unusual talents. From water conditioning and corrosion control, she moved to machine tool inspection—first for a large company and then for the Ordnance Department. She later joined the Cincinnati office of United States Engineers. And, all through that while, she did consulting work on the side. She holds a professional engineer's license in Ohio. Today she is spending full time as a consulting engineer in her home city, Cincinnati.

In 1921, two "Sibley Sues" from Cornell University, with degrees in mechanical engineering, join the parade of petticoat engineers. They received the first M.E. degrees issued to women by that institution. They are Marie Reith and Herma Marie Trostler.

Marie Reith joined the staff of the Consolidated Edison Company in New York City—is there today. She directs market analyses, investigates the substitution of alternating current for direct current, studies new uses for electrical equipment in the home, in business, in industry, and analyzes work procedures.

Unfortunately, no information could be obtained on Herma Marie Trostler.

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WSE Personals

Minor H. Fink, Illinois Bell Telephone Co., has been promoted from district plant engineer at 5643 Broadway, to division personnel supervisor at 208 West Washington St., Chicago.

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Margaret Arronet, another "Sibley Sue", with a C.E. degree from Cornell University, walks with her 1921 M.E. classmates. She worked as a draftsman with the American Bridge Company, then as an assistant in the research laboratory of the Portland Cement Association. In 1922-23 she served on the Hoover Mission in Russia. In 1926 she married Franklin Nichols Corbin, Jr., and retired from professional life.

We have watched the parade of pioneer women engineers from 1886 through 1921. And still they come!

But this paper has grown too long. The review must end. Like observers of other types of processions, we grow tired of watching the marching of engineers in petticoats. However, like other observers of other parades, we linger on for some one of special interest to come into view.

We wait to recognize Catherine Cleveland (Mrs. H. L.) Harelson, University of Kentucky, M.E., 1924, who, because she made the highest grades ever earned in the engineering college, was awarded the Tau Beta Pi Badge No. 1 for women engineers—this in 1934.

And, we continue to wait in our reviewing stand for another special person to appear—Dr. Lillian Gilbreth. She may well have joined in the procession of pioneer women engineers when she assisted her husband, the late Frank B. Gilbreth, in his standardization of construction practices which he started in 1904. She may, as a member of the staff of Gilbreth, Inc., have joined the procession in 1914, as at that time, she took full charge of the work for which she is so well known—time study, fatigue study, and skill study, that have been a boon to production. Management has long appreciated Dr. Gilbreth for her unique and valuable service to industry. Engineers recognized her contribution in their field in 1926, when the American Society of Mechanical Engineers elected her to full membership. So Dr. Lillian Gilbreth, with a bachelor's and master's degree in literature from the University of California, a doctor of philosophy degree from Brown University, enters the parade of pioneer women engineers as a member of A.S.M.E. in 1926. Engineers took further note of her work—the University of Michigan confered on her an M.E. degree in 1928, and Rutgers College, a doctor of engineering degree in 1929. I could continue to tell you of the many works and the many honors that mark Dr. Gilbreth's long professional career—but you know of her achievements and of her high position among engineers.

When we think of the many women who entered the engineering profession in the distant and not so distant past, we are tempted to wait for others to come into view. However, time grows short; we leave the reviewing stand. But, the procession of women engineers continues on through the "roaring '20's," the depression years of the '30's, the war years of the '40's, and the procession will continue through the years which lie ahead.

The woman who joins the procession of engineers today, tomorrow, and tomorrow's tomorrow benefits by a rich heritage bequeathed to her by Edith Julia Griswold, Bertha Lamme Feicht, Marion Parker Madgwick, and Kate Gleason. She assumes automatically the responsibility to further prove that petticoats and slide rules are compatible, and she must not carry the responsibility lightly. Her task is to widen the trails blazed for her—and more. She must build them into great highways for women engineers of the future to travel, free of prejudices and discrimination. This she can do by following Kate Gleason's formula—apply hard work, courage, and plenty of common sense to her engineering job. At the same time, it would be well for her to expect no favors because she is a woman. The records prove she can succeed in spite of being a petticoat engineer.

Crerar Library

Notes and News

Crerar Library has been designated a depository of reports issued by the Division of Atomic Energy of the Ministry of Supply of Great Britain. This results from an agreement recently concluded by the U. S. Atomic Energy Commission, in cooperation with the Office of Technical Services of the U. S. Department of Commerce. Current issues of reports are being received, and it is anticipated that a back file of some 300 reports will be received later. Crerar was already serving as a depository of the U. S. Atomic Energy Commission publications.

* * *

Teletype equipment was installed in the Administrative Office of the Library on July 31; and the following day the first message was received—an interlibrary request from Westinghouse Electric Company in Pittsburgh. The initial purpose of the teletype is to serve as a unit in the interlibrary communications system adopted by member libraries of The Midwest Inter-Library Center. It will be used by Crerar for rush loans for its own readers when needed items are lacking. It is anticipated that the greatest use will be from out-of-town companies requesting rush attention to interlibrary loans, photoduplicates, or assistance of Research Information Service.

The Library has long been adjusted to the use of special communications equipment within the building. There are telautograph lines between each of the reference departments and the serial record and shelf-list for quick communication of information needed by readers about the collections. And use is made of intercommunication lines available through regular telephone instruments. This use is in line with the Library's practice of employing electrical and mechanical devices wherever they will increase the work capacity of personnel.

* * *

The demands for photoduplication service continue to increase, having more than doubled during the past twelve months. The January estimate for 1952, well above the 1951 production, is being exceeded at a rate of 83 per cent. Most orders come from the Chicago area, but many orders are received from all sections of the country.

WSE Applications

25-84 Alvin Gates, Engineering Inspector, Lansing, B. Warner, Inc., 4210 Peterson Av.

26-84 Miss Jeanne P. Aitchison, Technical Copy Director, Grant-Jacoby Studios, 936 N. Michigan Av.

27-84 Justin C. Williams, Sales Engineer, V. E. Winfield, 407 S. Dearborn St.

28-84 Richard S. Hartenberg, Assistant, Assoc. Prof. Engrg. Mech., Northwestern University Technological Institute, Evanston, Ill.

29-84 Melbourne A. Noel, Civil Engineer III, City of Chicago, 188 W. Randolph St.

30-84 H. Gladys Swope, Senior Chemist, Chemical Engrg. Div., Argonne National Laboratory, P. O. Box 5207.

31-84 Allen R. Neinast, Process Engineer (Tool Research), International Harvester Co., Mfg. Research, 5225 S. Western Blvd.

32-84 Eugene C. Lang, Secretary-Treasurer & Engineering Mgr., Laramore and Douglass, Inc., 79 E. Adams St.

33-84 Frank D. Cooper, Chief Structural Engineer, Laramore and Douglass, Inc., 79 E. Adams St.

34-84 Benjamin Lewandowski (Rein.), Building Construction Engineer, 7606 Devon Ave.

BUSINESS BRIEF

American industry is spending approximately $25 billion a year for new plants and equipment. A substantial part of this goes into expanding plants and equipment, which means new jobs for our growing population.

Reviews of Technical Books
Available at WSE Headquarters

Data Book

Data Book for Civil Engineers—Design, by Elwyn E. Seelye, John Wiley & Sons, Inc., New York 16, N. Y. Second Edition 1951. 521 9⅜ by 11¾ pages. $10.00.

This is the first volume of a three-volume series that provides a concentrated collection of data necessary to design, place under contract and construct all types of civil engineering structures. Modern codes, practices and designs are emphasized.

Volume 1 supplies the engineer with data necessary to design work in any field of civil engineering—structures, sanitation, water supply, drainage, roads, airfields, dams, docks, bridges, soils, etc. The data includes rules of practice, constants of nature, design formulas, details of engineering structures and other necessary material. There are many tables and curves to save the engineer's time by minimizing calculations.

It has an excellent index.

H.P.H. W.S.E.

Electronics

TV and Electronics as a Career, by Ira Kamen and Richard H. Dorf. John F. Rider, Publisher, Inc., New York 13, N. Y. First Edition. 1951. 326 pages. $4.95.

This is not a technical book. However, it tells a fascinating story of our most booming industry—electronics. It is written for those in and out of this field who are seeking career guidance, but can be enjoyed by anyone interested in the subject.

The story is principally about AM-FM radio and television in civil life, and electronics including Radar and Sonar in the armed forces. Communication, manufacturing, engineering, distribution and sales, and servicing phases are covered along with the way each man contributes to the over-all operation. Salaries, prerequisites, and advancement possibilities are expertly discussed.

It is full of solid facts written by practical men.

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Austria, Mexico, Brazil, Argentina and Chile.

The larger societies which actively participated in the convocation included the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the American Institute of Chemical Engineers.

All sessions of the tremendous program covering an array of subjects never before duplicated was open to the public. Some of the topics included were "The Engineer and the Scientist," "The Technical Institute: Its Relation to Engineering Education and to Trade Training," "Food—No. 1 World Problem," "Balanced Use of Land," "Role of the Farmer," "100 Years of Food Distribution."

Other subjects for discussion covered Tools, Transportation, Mining, Iron and Steel Production, Structures and Construction, Chemical Industries, Communications, Energy, Oil Products, Steam and Electric Power, Health and Human Engineering, Urbanization, etc.

In an effort to overcome the acute shortage of college trained engineers in this country, more than 150 leading technical schools and universities were invited to encourage present students and enrollees to participate actively in the various events of the Centennial.

Lohr stressed that attendance at the celebration would give students an unusual opportunity to ascertain in just what industrial and allied fields engineers are needed the most, as well as put them in personal touch with business leaders who are looking for promising young timber. Students were offered the unprecedented opportunity to sit in the same room and see and hear famous engineers of the world discuss past, present and future developments in every conceivable phase of engineering.

A special motion picture entitled "Miracles for Millions" was shown during the Convocation. It is a full color portrayal of the part engineering has played in building the high standards of American living. The picture will be distributed nationally.

Engineering Societies Personnel Service, Inc.

New York Chicago Detroit San Francisco

84 East Randolph St., Chicago 1, Ill., ST ate 2-2748

These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated. Prepared ENGINEERS AVAILABLE advertisements limited to 40 words, with typed resume attached may be submitted to ESPS Chicago by members of Western Society of Engineers at no charge.

If placed in a position as a result of an Engineers Available or Position Available advertisement, applicants agree to pay the established placement fee. These rates are available on request and are sufficient to maintain an effective non-profit personnel service. A weekly bulletin of positions open is available to subscribers. Apply ESPS Chicago.

POSITIONS AVAILABLE

D-7968 PRODUCTION PLANNING ANALYST, engineering degree and some accounting experience. Farm machinery background helpful. Duties: review product changes and advise management regarding costs necessary to produce the improved product. Age 25-35. Salary $500-$600. Location: Michigan.

T-9197 PLANT INDUS. ENGR. Grad. B. S. Ind. or Mech. Prefer supplementary educ. in economics-business admin. 8-10 yrs. actual indus. engrg. exp. Major emphasis in process'g inds. Exp. should include time & motion stud., establishing time standards for use as basis for standard costs or for wage incen., cost estimating, on new products or processes, work simplification, plant layouts, developing and installing cost controls, master scheduling, wage incentive systems planning, pre-planning mainten. programs & related activities. Ability get along with foremen & sub-foremen Sal. $450-550. Company may negotiate fee. Location: 1 for Niagara Falls, N. Y.; 1 for No. Carolina.

R-9198 SALES TRAINEE—Grad. Engineer. Age: 25. Duties: trainee for eventual sales engineering work. Training program consists of 6 weeks at factory in East and then in Chicago office for about a year answering technical correspondence, quotations, etc. for a manufacturer of industrial control instruments. Salary $350 plus depending. Location: Chicago.

R-9199(a) ENGINEER* (*) Description below under duties. B. S. M. E. B. S. E. E. or equiv. in practice exper. Age: 20-40. 1 year exp. in building mechanical system design, (heating, ventilating, air conditioning, plumbing, process piping) or build electrical system design or area utility design. (*) An individual who has some exper. and skill as a designer (will work "on board" as designer,) but exercises no supervision over others. For a Consulting Engineer. Salary $80-$132 week (depending on skill level). Employer will pay fee. Location: Chicago.

R-9199(b) DRAFTSMAN* (*) Description below. B. S. M. E., B. S. E. E. Technical High School. Age: 20-40. 1 year or equiv. exp. in building mechanical system design (heating, ventilating, air-conditioning, plumbing, process piping) or building electrical system design or area utility design. *An individual who (at top level) is skilled and experienced, but lacks technical training and requires some guidance supervision (Newly graduated engineers acceptable). For a consulting engineer. Salary $66-$88. Oper. wk. Employer will pay fee. Location: Chicago.

T-9200 MACHINE DESIGNING—PROJECT ENGR. Grad. M. E. Age: 35. 10 years' experience design and development high speed automatic machinery. Able to make des. and follow thru to completion. Actual Duties: design, development and project engraving. For a manufacturer of paper products designing and building own production machinery. Applicant able to develop into Chief Engineer eventually. Salary 8-$10,000 year. Location: East.

R-9201 SUPERINTENDENT OF PUBLIC WORKS & VILLAGE ENGR. Engrg. Deg. or Equiv. Age: 27-55. 3 years exp. preferably as city engineer or assistant. Exp. in city engineer or assistant. Exp. in city public works maintenance activities. Duties: direct program of street, sidewalk, street light, storm & sanitary sewer maint. Administer building code enforcement. Make studies of proposed installations by subdividers. Act as engrg. advisor. For a municipality. Salary $6000 year. Employer will pay fee. Location: Illinois suburb.

ENGINEERS AVAILABLE

FACTORY MGR. EE 39. Seven yrs. Factory mgr. Responsible for production, personnel, maintenance, specification of all electrical equip. Eleven yrs. Salesman application engr. for special controls primarily with ultimate users of the equipment. $12,000 Midwest 444 MW.

RECENT GRAD Arch. Eng. 25. Three mos. Draftsman of plats of survey and working drawings for sewerage, water and roadway installations. Rodman and general assistant to surveyor. $3500 Midwest 445 MW.

PETROLEUM ENG. Pet. Engr. 35. Thirteen yrs. as a Lubrication Engineer, sales trouble-shooting, development of metal working lubricants, pilot plant processing of lubricants and additives. $5000 Midwest 446 MW.

DEVELOPMENT ENGR. Chemistry 34. Three and one half yrs. Staff Chemist charge of product development and raw material control. Five yrs. Sr. Research Chemist charged with the development of new printing inks, varnishes, and resins. $10,000 Midwest 447 MW.

SALES ENGR. EE 25. Two yrs. in U. S. Army learning and helping to repair radar & computer. Eight mos. Apparatus Engr. studying some apparatus problems in the production & suggesting remedies for these problems & effectively carrying out these changes. $5000 Midwest 448 MW.

DEVELOPMENT EE 28. Two and one half yrs. Test and installation of electrical assessories for tractors, power units, special applications, etc. Included some design of test facilities and preparing test procedure. $4800 Midwest 449 MW.

CHIEF ENGR. Ch. E. & M. E. 45. Seven yrs. Chief Engr. charge of eng. dept., design and tool room, chem. lab., started business of manuf. fork lift trucks. $10,000 Midwest 450 MW.

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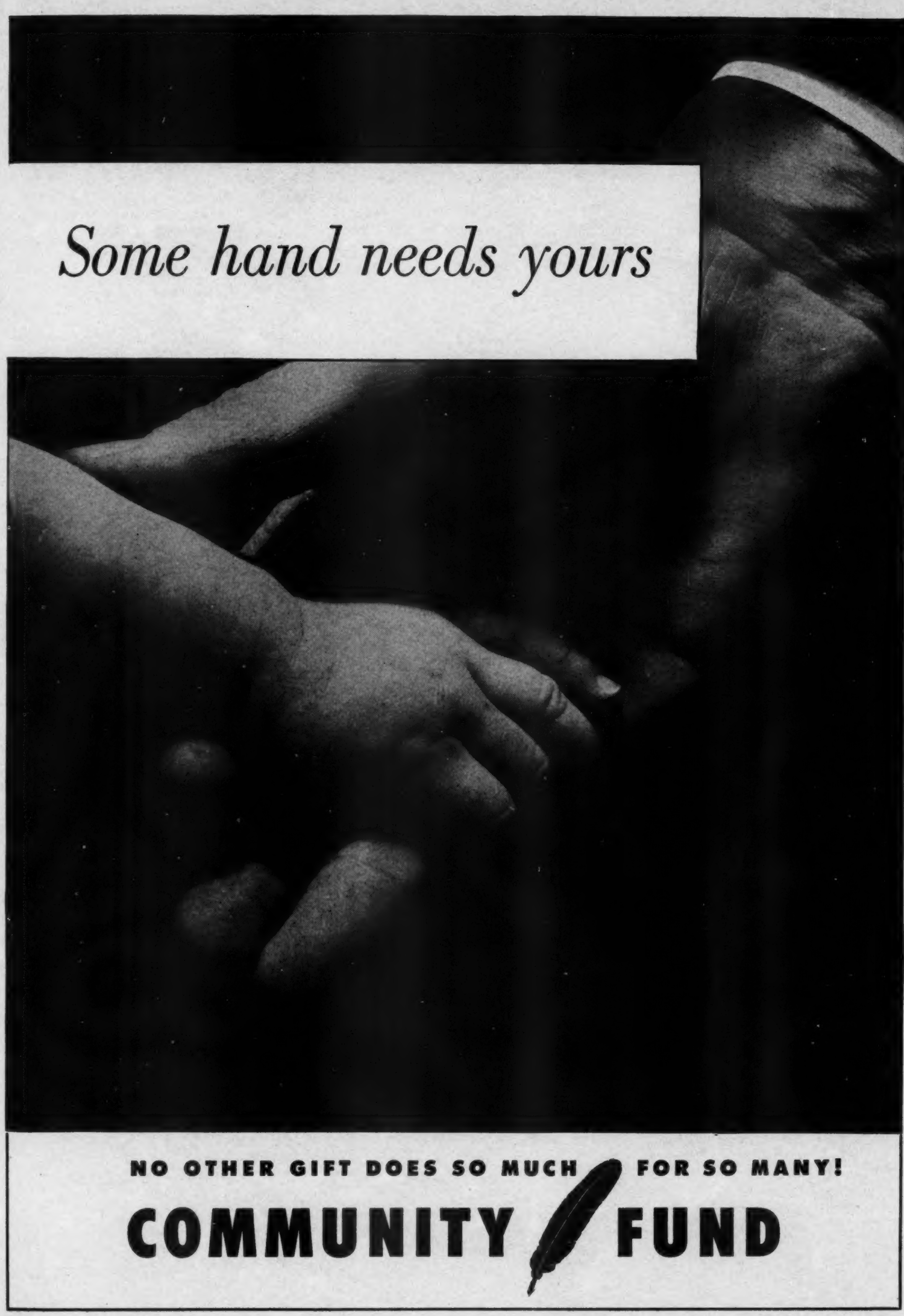
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